MDOT
Michigan Department of Transportation

OFFICE MEMORANDUM

DATE: February 2, 2004

TO: Region Engineers
Region Delivery Engineers
TSC Managers
Resident/Project Engineers
Region Construction Engineers

FROM: Larry E. Tibbits
Chief Operations Officer

John C. Friend
Engineer of Delivery

SUBJECT: Bureau of Highway Instructional Memorandum 2004-07
Clarification on Hot Mix Asphalt (HMA) Specifications
Requirements and Testing Procedures

The purpose of this memo is to provide clarification on HMA specifications requirements and testing procedures. A new procedure for sampling HMA mixture from behind the paver will also be introduced.

Specifications Issues:

In the Special Provisions for Furnishing and Placing Superpave Hot Mix Asphalt Mixture (with Sampling behind the Paver), Section a1., and Furnishing and Placing Marshall HMA Mixture (with Sampling Behind the Paver), the definition for random sampling states that the samples will be taken by a random process managed by the engineer. Throughout the state there are several methods being used for selecting and documenting the random number process. The following is the required procedure that should be used to ensure the random sampling process is uniform, properly documented, and reproducible.

1. Prior to the pre-production meeting, generate three columns of random numbers using a computer spreadsheet program or a calculator (See Attachment 1). The random numbers will be used for the longitudinal and the transverse measurement for determining the core location and the HMA mixture sample location. Generate an excess amount of random numbers to take into account overruns or any situation where another random number is required.

2. At the pre-production meeting, present each page that lists random numbers (cover the numbers with a separate sheet of paper) for signature of the contractor and delivery engineer.

3. Place the original list in the project file. Copies go to the MDOT field personnel.

4. The list of random numbers will be provided to the contractor when the project is completed.

Another issue within this same specification concerns the time frame for testing cores. The current specification requirement states "Pavement density acceptance testing will be completed by the Engineer within two (2) work days after the Engineer has taken possession of the cores at the project site." The new requirement for completion of testing cores has changed from two work days to four work days.

The specifications allow the contractor to request sublot QA referee samples testing without any restrictions. Communication and timeliness issues in the delivery of samples have resulted in several projects experiencing lengthy delays in receiving final test results. The following changes will reduce delays in the process.

1. The person whose name appears on the documents submitted with the referee sample will receive test results from the referee testing. A designated person from each of the regions will also receive a copy of the test results. Both individuals will have a shared responsibility to make sure the engineer is provided a copy of the test results.

2. The current specifications read "The Engineer will send the referee sample within two business days after the MDOT Central Laboratory or other AASHTO accredited laboratory has been selected and approved by the Engineer." Replace this sentence with the following, "The Engineer will send the referee sample to the Central Laboratory within two business days after the Engineer has received a written request to have sublot QA referee samples tested."

3. The engineer will receive the referee test results within three weeks of the date the sample was received at the central lab. The engineer will then provide a copy of the test results to the contractor within five business days.

When a sublot QA sample is missed for any reason, the tonnage from that sublot will be included in subsequent sublots. The reason for the missed sample will be documented and reported to the region associate engineer, and the Lansing construction paving engineer. The lot will be considered complete once the engineer has three test results. Taking two samples from the subsequent sublot is not an acceptable alternative.

Sampling and testing procedures: MDOT, FHWA, and industry representatives have agreed to a new procedure for sampling HMA mixture from behind the paver. The engineer or contractor may request a change to this new sampling procedure. Following is a description of the new sampling procedure and an example of a contract modification.

The current QC/QA specification requires the engineer to take one large sample from behind the paver. Using a splitter, the sample is then divided equally for contractor testing and MDOT testing. The remaining mixture from the MDOT sample is saved for possible referee testing. For the new sampling procedure, the engineer takes two independent samples of lesser quantity (see Attachment 2). One independent 20,000 gram (bucket ½ full) sample is taken using the procedure defined in MTM 324, Sampling HMA Paving Mixtures Behind the Paver. This sample is used for MDOT QA testing. The other independent 20,000 gram sample, identified as a referee sample, is taken in close proximity to the first sample, also in accordance with MTM 324. The referee sample is stored at the region lab for possible referee testing. The contractor is required to take a 20,000 gram sample using the sampling method, again in close proximity to the random sample location. The contractor's sampler must be certified by the region's traveling mix inspector for sampling HMA behind the paver in accordance with Bureau of Highway Instructional Memorandum 2002-09. The engineer will notify the contractor prior to sampling to ensure that the contractor has a certified sampler available. In most cases the contractor will need to use MDOT's sampling equipment, i.e., shovel and plates. The contractor is required to immediately fill all the voids in the pavement with HMA.

This sampling method eliminates the need for a splitter and the referee sample is not subject to handling or re-heating. Other benefits come from the contractor's involvement and responsibility in the overall sample process.

The sampling plates must be used when sampling HMA directly over aggregate, rubblized, crushed and shape base, or a cold milled surface. When sampling HMA on concrete surfaces, leveling and top course mixtures, it is recommended using the shovel only for ease and safety.

Example of Contract Modification: Under Description of Changes, use the following wording.

The intent of this contract modification is to change the field sampling of the hot mix asphalt (loose) as referenced in the Special Provisions for Furnishing and Placing Superpave Hot Mix Asphalt Mixture (with Sampling Behind the Paver) (FUSP 03SP504[A]), and Furnishing and Placing Marshall HMA Mixture (with Sampling Behind the Paver) (FUSP 03SP504[B]), (FHWA approval on August 20, 2002). The intent is for the department and contractor to obtain independent samples without splitting for quality assurance testing. The following revisions to the special provision are:

1. Section d., Quality Assurance, 2. Hot Mix Asphalt (loose), delete the first sentence of the first paragraph and replace with "The Engineer will collect a random Quality Assurance sample independently from the Contractor's Quality Assurance sample. In close proximity, the Engineer will collect another independent sample that will be retained at the Region Central laboratory for possible referee testing. The Contractor will be responsible for taking an independent Quality Assurance sample in the vicinity of the Engineer's sample using the same method and sampling equipment as MDOT."

2. Under section d. Quality Assurance, 2. Hot Mix Asphalt (loose), fifth paragraph, delete the first two sentences reading "A minimum 45,000 gram sample shall be taken. The sample will be divided equally for Contractor and MDOT testing." Replace with "As described above, a minimum of two 20,000 and one 20,000 gram samples shall be taken independently by the Engineer and Contractor, respectively".

3. Under section d. Quality Assurance, 2. Hot Mix Asphalt (loose), sixth paragraph, revise the sentence from "The following tests shall be conducted by the Contractor and the Engineer, on the QA sample splits" to "The following tests shall be conducted by the Contractor and the Engineer on their independent QA sample".

To reduce variability between test results, i.e., contractor vs. MDOT, the following change to the test method for Theoretical Maximum Specific Gravity and Density of Bituminous Mixtures is effective immediately. An update of MTM 314 will be issued to reflect these changes.

When performing the test, the vacuum pressure requirement must be regulated to 25 ± 2 mm of Hg. A bleeder valve is used to adjust the vacuum pressure; this valve is located between the vacuum pump and pycnometer.

Each laboratory performing this test needs to ensure that the monometer used to measure the vacuum pressure is in the correct location (See Attachment 3). If you need assistance in changing your set up, please call 517-322-5668.

Chief Operations Officer

Engineer of Delivery

BOHD:C/T:GM:kab
Index: Bituminous

cc: C & T Support Area Staff
Design Support Area, M. VanPortfleet
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C & T Support Area, B. O'Brien
C. Rademacher
G. Moore
T. Fudaly, FHWA
MAPA
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MPA

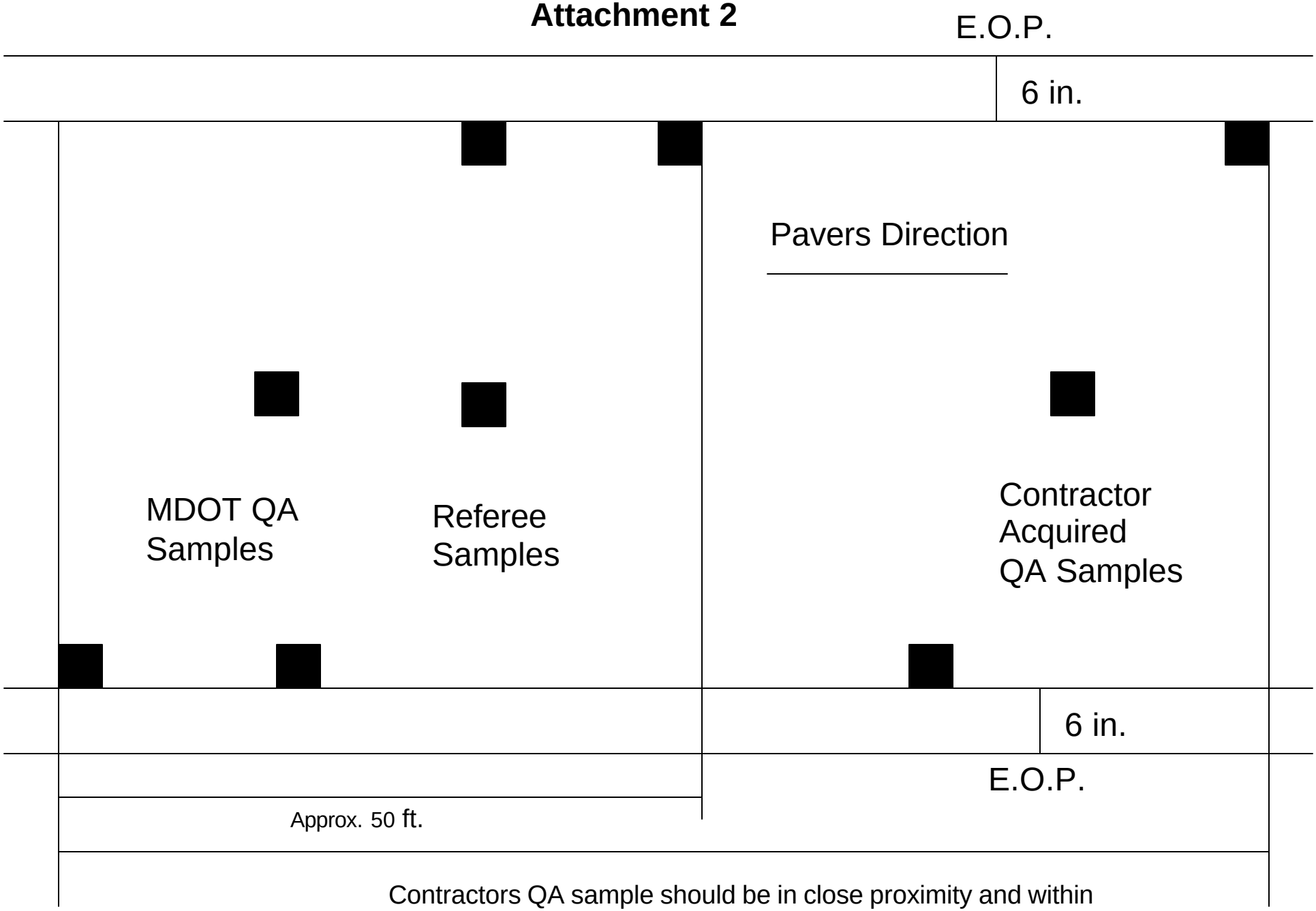
Attachment 1

Control Section: **Job Number:**
Contractor:

Core Sample Locations		Mixture Sample Locations
Longitudinal	Transverse	
0.656867	0.455486	0.960660
0.148183	0.204484	0.987348
0.057930	0.781182	0.258606
0.358807	0.684509	0.329604
0.167207	0.220901	0.819073
0.997653	0.964057	0.709663
0.307889	0.879518	0.440942
0.874599	0.450938	0.437249
0.614363	0.814605	0.527260
0.163975	0.525669	0.325457
0.873531	0.099818	0.862245
0.609374	0.090916	0.058003
0.433804	0.035931	0.390677
0.992080	0.953143	0.389387
0.394133	0.136925	0.453332
0.292758	0.519593	0.391838
0.389072	0.822961	0.223315
0.271477	0.554282	0.514307
0.875477	0.815226	0.145026
0.441672	0.213481	0.981868
0.232382	0.053253	0.835736
0.217393	0.866698	0.046087
0.735159	0.376810	0.828106
0.649478	0.865000	0.095674
0.036598	0.722192	0.301790
0.769557	0.443998	0.225851
0.165009	0.734673	0.624785
0.645347	0.822881	0.993525
0.680728	0.408065	0.804580
0.271812	0.328397	0.271519
0.196320	0.019460	0.834849
0.777006	0.037349	0.289952
0.759043	0.368682	0.006931
0.504281	0.284202	0.295875
0.522787	0.593429	0.215465
0.094930	0.008388	0.417575
0.549015	0.854678	0.878852

Signature:
Contractors Representative Date
MDOT Representative Date

Attachment 2



Contractors QA sample should be in close proximity and within the same haul unit as the MDOT samples

Attachment 3